

# PATENT SPECIFICATION

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409,528

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## COMPLETE SPECIFICATION.

### Improvements in Liquid Conducting Conduits.

(A communication from abroad from the  
AEROL ENGINE CORPORATION, a corpora-  
tion organised and existing under the  
laws of the State of New York, United  
States of America, of 26, Washington  
Square, Newport, Rhode Island, United  
States of America.)

I, ARTHUR FREDERICK BURGESS, a  
British Subject, of the firm of Lloyd  
Wise & Co., of 10, New Court, Lincoln's  
Inn, in the County of London, Chartered  
Patent Agents, do hereby declare the  
nature of this invention and in what  
manner the same is to be performed, to  
be particularly described and ascertained  
in and by the following statement:—

This invention has for its principal  
object the production of a conduit or tub-  
ing for conducting liquids therethrough  
and so constructed as to prevent the  
formation of airlocks therein when the  
liquid is flowing or is forced therethrough.

In certain types of machines or engines  
it is absolutely necessary that oil or fuel  
be fed from one location to another with-  
out collecting in bends to form airlocks  
in order that the machinery or engine  
shall function effectively and satisfac-  
torily. This is especially true in injec-  
tion lines of solid injection Diesel engines  
to which the invention is particularly  
applicable.

The liquid conducting conduit accord-  
ing to the invention comprises an outer  
tubular member and an inner filling mem-  
ber fitted snugly therein so as to occupy  
the major portion of the interior thereof,  
said members being formed to include be-  
tween them one or more restricted spiral  
passageways of uniform cross-sectional  
area, extending throughout the entire  
length of said conduit.

In the accompanying drawing illustrat-  
ing several practical embodiments of the  
invention:

Fig. 1 is a cross section taken through  
the conduit shown in Fig. 2.

Fig. 2 is a horizontal section taken  
through the conduit.

Figs. 3 and 4 are views similar to Figs.  
1 and 2, respectively, but showing a modi-  
fication.

Figs. 5 and 6 are views similar to Figs.  
1 and 2 and showing in section and eleva-  
tion, respectively, a further modification.

Referring in detail to the drawings:

A section of a fuel injection pipe is in-  
dicated at 1. This pipe is of uniform  
construction from the intake end, con-  
nected with the fuel pump or other means  
(not shown) for supplying fuel to the  
point of discharge into the combustion  
chamber of the self-igniting internal com-  
bustion engine. In order to break up  
any eddy streams and give the fuel a  
high velocity, sufficient to break up any  
air bubbles into fine particles and to pre-  
vent such air from collecting in the  
corners or elsewhere in the pipe, the in-  
terior of the pipe 1 is provided with an  
inner member 2 which occupies the major  
portion of the interior of the pipe 1. The  
member 2 constructed as shown in Figs.  
1 and 2 is formed from a solid hexagonal  
bar twisted to form spiral passageways  
having a relatively shallow pitch. The  
inner member 2 so formed is fitted snugly  
within the interior of the pipe 1 so that  
the points of the inner bar engage the  
interior surface of the pipe for the entire  
length of the pipe. The result is a plur-  
ality of small smooth-walled tortuous fuel  
passages which give to the fluid passing  
through the same a high velocity. Any  
air bubbles therein are broken up into fine  
particles and readily absorbed and carried  
away in the fuel stream.

In the modification illustrated in Figs.  
3 and 4 the outer tube or pipe is indicated  
at 4 and the inner solid member is indi-  
cated at 5. The configuration of the  
latter member conforms to that of the  
outer member 4 within which it is snugly  
received but the inner member is formed  
with a single spiral passageway 6.

In the foregoing examples the filling  
member is made of out-of-round bar  
material. In the modification of Figs. 5  
and 6, on the contrary, the outer member  
7 is formed with a plurality of angled  
sides, it being rectangular in the specific  
embodiment shown. The inner solid  
member 8 is round and fits snugly within  
the outer member. The outer rectangular  
member is twisted, as will be clearly seen  
in Fig. 6, to form a plurality of spiral

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passageways 9, indicated in Fig. 5.

The use of the above described devices will be readily understood. As will be seen, the tubing through which the fuel is supplied from the fuel pump or other means of supply passes to the intake in the engine presents to the flowing fuel one or more small uniform spiral passages, thereby giving the fuel a high velocity. The result is that any air bubbles in the fuel passageway or passageways are broken up and carried away with the fuel stream. This result is accomplished without materially decreasing the flow of fuel since passages formed in accordance with the invention are smooth and substantially uniform in cross section from one end of the tube to the other.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. A liquid conducting conduit, such as a conduit for conducting fuel from a fuel pump or other means for supplying fuel to the combustion chamber of an internal combustion engine, said conduit comprising an outer tubular member and an inner filling member fitted snugly therein so as to occupy the major portion of the interior thereof said members being

formed to include between them one or more restricted spiral passageways of uniform cross sectional area, extending throughout the entire length of said conduit.

2. A conduit according to claim 1, wherein either the inner or the outer member is formed of out-of-round material twisted on a gradual pitch.

3. A conduit according to claim 1 or claim 2 wherein the inner filling member consists of a twisted bar which presents alternate spiral projecting edges and intervening smooth portions to the interior of the outer tubular member to form one or more restricted enclosed spiral passageways.

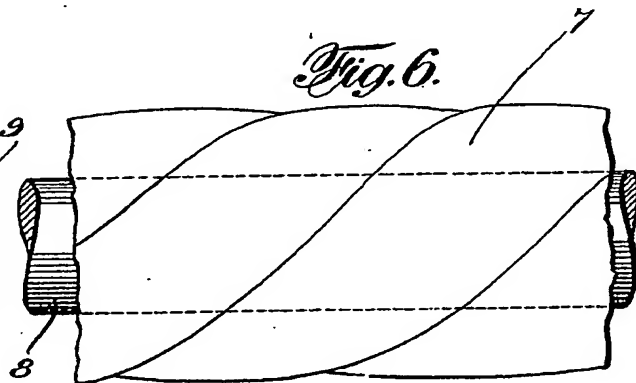
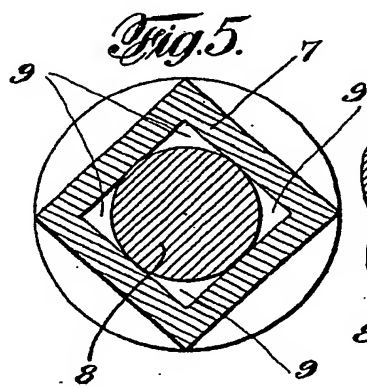
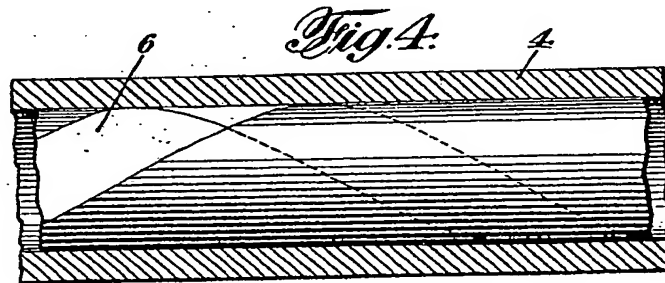
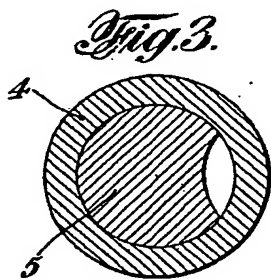
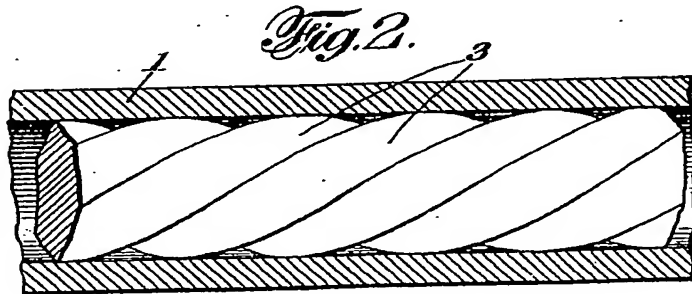
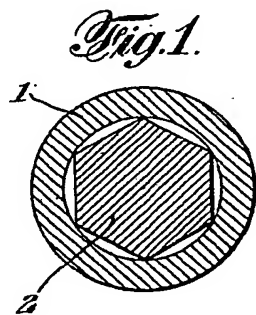
4. A conduit according to claim 2 having an inner filling member of substantially round cross section and a twisted outer member formed of out-of-round material.

5. A conduit for conducting liquid, constructed and operating substantially as described with reference to the accompanying drawing.

Dated this 28th day of June, 1933.

For the Applicant,

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Chartered Patent Agents.



[This Drawing is a reproduction of the Original on a reduced scale.]

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